

## The IWYP Hub at CIMMYT – A Platform and Development Pipeline

The IWYP Hub at CIMMYT is a unique facility that enables cutting-edge research to be translated directly to wheat yield improvement. It forms part of an international collaborative network and private-public partnership where pre-breeding outputs are delivered to breeders worldwide through coordinated international trialing. The technical team at the IWYP Hub has a proven track record of breeding higher yielding wheat lines by selecting targeted physiological traits.

### Platform - Major Components and Capabilities

- 1 **World-class scientific expertise** – Team of highly experienced plant physiologists, geneticists, breeders, and support staff
- 1 **Infrastructure and capacity** – 10 dedicated hectares at the CENEB CIMMYT field station in Obregon, as well as off season screening facilities in central Mexico
- 1 **Environmental relevance** - Location mimics major spring wheat growing regions
- 1 **Novel genetic yield potential traits (PT)** – Physiological traits with demonstrated impact on genetic yield potential
- 1 **Phenotyping** – Application of precise and novel technologies and HTP platforms
- 1 **Germplasm base** – Access to foundation germplasm developed over several years that IWYP can build upon, as well as the World Wheat Collection housed by CIMMYT
- 1 **Marker-assisted breeding** – Rapid genotyping to help accelerate yield improvement
- 1 **Field trialing network** – via the International Wheat Information Network (IWIN)

### Pipeline – Validation and Development of Innovations

Project outputs are validated and translated into pre-breeding products. As new traits enter the pipeline from the IWYP projects they are systematically validated for their effect on genetic yield potential under field conditions. Validated traits are then stacked. Traits influencing photosynthesis and biomass (source) are combined with traits influencing the production of grain (sink), to drive yield gains. Successful traits also feed other Hubs in the IWYP Hub network. Traits in the pipeline are tracked using a Stage Gate process (see below).

### Outcomes

New lines exhibit significant improvements over test varieties in several target traits as well as yield, including 20% or more increased biomass, around 30% higher radiation use efficiency (RUE), 10-15% higher photosynthetic efficiency, 20% more grains and 15% larger and heavier grains. Novel trait packages / stacks are being made following the breeding strategy to combine source+source, sink+sink, source+sink traits. New traits are also being validated, e.g., sun-shade transition, decreased respiration, altered canopy architecture. Several lines developed as part of this strategy and disseminated to partners have since been released as varieties (e.g. Pakistan-13, Kohat-17).

